with about eight gray spots, a subtriangular one extending from costa to the fourth vein a short distance before the small crossvein, a subquadrate one extending from costa to the third vein just before apex of first vein, a streak on small crossvein and another on fourth vein a short distance beyond the latter, a small spot on upper side of fifth vein slightly beyond its middle and a larger one on the under side before its middle, a large one along hind margin of axillary cell near its middle and a curved one in apex of this cell; remainder of wing gray, a large whitish hyaline spot at apex of third vein nearly crossing the first posterior cell and extending along the third vein to the hyaline portion at base of wing, a second large whitish hyaline spot midway between apices of third vein and upper branch of the fourth, almost crossing the first posterior cell, a small hyaline spot in apex of second posterior cell and another a short distance before it, a larger one on middle of lower branch of fourth vein, one in apex of third and another near middle of hind edge of fourth posterior cell; upper branch of fourth vein, apical portion of the lower branch, and both branches of fifth vein narrowly bordered with hyaline; third vein connected near its middle by a crossvein with the first, apex of third vein beyond two-thirds length of wing, apex of first vein near middle of the third, fourth vein forks slightly beyond the small crossvein, axillary angle of wings well developed; length, 1.4 mm.

Three female specimens collected by Dr. A. Lutz.

Habitat. — Sao Paulo, Brazil.

Type. — No. 7724, U. S. National Museum.

THE LIFE HISTORY OF CULEX CANTANS MEIGEN.

By Harrison G. Dyar, A.M., Ph.D.,

Washington, D. C.

(Plate I.)

This mosquito flies most of the summer, but it is single brooded. The larvæ hatch from over-wintering eggs very early in spring, but the growth is not very rapid, probably a month being required before adults appear. These fly some weeks before becoming ready to oviposit. A female at New Hampshire was kept alive from July 20 to August 12; another taken August 8, laid eggs August 16. In British Columbia, a female taken June 15, laid eggs June 30 and these remained unhatched till the following year, although kept in water. They hatched as soon as the ice was melted in the jar the following spring.

The eggs (Plate I, Fig. 1) are laid singly and readily sink in the water. They are elliptical, the thickest part at one third from the

micropyle, one side flattened; finely reticulate, the reticulations elongated, the spaces between them depressed to form shallow pits, more prominent at the ends. At the micropylar end is a slight clear cushion. The sculpturing is distinct, apparently not granular, the outline being smooth except just at the ends. Length .8 mm., width .25 mm. The eggs are usually white when first laid, but soon turn deep black.

In the first larval state (Plate I, Fig. 2), the usual generalized characters are shown. The head is flattened, circular in front, antennæ rather long, uniform, with a single hair near the middle, uniformly infuscated. The body is normal, thorax enlarged, abdominal segments submoniliform, colorless, the hairs moderate, becoming weaker posteriorly. Air tube long, the outer third infuscated; a double row of pecten at base composed of lamellar dentate spines (Plate I, Fig. 4); lateral comb of the eighth segment a row of six or eight parallel bar-shaped spines (Plate I, Fig. 3). The anal segment has a small dorsal plate, the usual terminal tuft, but no ventral brush. The four anal processes are normal, large but not inflated nor conspicuously tracheate.

The second stage shows the usual definite change, although the mature characters are not fully developed. The head is much the same, the antennæ still with the tuft about the middle of the uniformly shaped joint. Body as before, the air tube, however, infuscated throughout (Plate I, Fig. 7) and with its pecten teeth modified into the more specialized shape of the adult larva, a spine with small teeth at the base (Plate I, Fig. 6). The anal segment has a larger plate, the ventral brush is present with slight tufts preceding the barred area (Plate I, Fig. 5). The comb on the side of the eighth segment is composed of thorn-shaped spines in a multiple row (Plate I, Fig. 8).

The third stage hardly differs at all from the second except in size. The spines of the lateral comb are more numerous, but the dorsal plate of the anal segment is still incomplete.

In the fourth stage the larva is mature. The head is rounded, flattened, mouth brush moderate, antennæ uniform, with the tuft at the middle, infuscated (Plate I, Fig. 9); the labial plate is broadly triangular, with coarse teeth at the sides, fine ones at the apex. The body hairs are moderate, the thoracic ones multiple, arising from infuscated tubercles but without any distinct posterior spine on the lower metathoracic tuft; abdominal hair diminishing posteriorly.

Air tube long, fully four times as long as wide, tapering regularly, a little flared at tip (Plate I, Fig. 11), the basal pecten distinct, the last two spines large and detached, followed by a single hair tuft at about the middle of the tube, infuscated. Lateral comb a patch of spines in about three rows (Plate I, Fig. 12), the single spines thorn-shaped, minutely divided around the base (Plate I, Fig. 13). Anal segment with a large dorsal plate which reaches near to the ventral line but does not encircle the segment. Anal tuft normal, the ventral brush large with small tufts preceding the barred area (Plate I, Fig. 10). Anal processes four, moderate, normal.

Pupa not distinguishable from those of its allies.

The larva falls between *canadensis* and *sylvestris* in its general characters but is differentiated by its abnormally long air-tube, which throws it in the "long-tubed section" of the synoptic table.

Eggs were obtained by me at Durham, N. H., and Kaslo, B. C. Preserved material examined, collected by Mr. F. Knab at Springfield, Mass., and by Mr. O. A. Johannsen at Ithaca, N. Y.

EXPLANATION OF PLATE I.

Fig. 1. *Culex cantans* Meig., egg.
Fig. 2. Larva, stage I.
Fig. 3. A single spine of the lateral comb of joint 8.
Fig. 4. A single tooth of the air-tube pecten.
Fig. 5. Stage II, diagram of the anal segment.
Fig. 6. A single tooth of the air-tube pecten.
Fig. 7. The air-tube.
Fig. 8. The lateral comb of the 8th segment.
Fig. 9. Stage IV, antennæ.
Fig. 10. Diagram of the anal segment.
Fig. 11. The air-tube.
Fig. 12. The lateral comb of the 8th segment.
Fig. 13. A single tooth of the comb.